REMARKS

Applicants appreciate the Examiner's thorough consideration provided the present application. Claims 1-8 and 12-23 are currently pending in the instant application. Claims 1-8 and 12-23 have been amended. Claims 1, 5, 7, 12, 19 and 22 are independent. Claims 9-11 have been cancelled. Reconsideration of the present application is earnestly solicited.

Allowable Subject Matter

Applicants appreciate the Examiner's indication of allowable subject matter. Specifically, the subject matter of claims 12-15 has been indicated as being allowable if rewritten in independent format without the presence of the alleged minor informalities.

Claims 22 and 23 have been indicated as being allowed. However, the Examiner has also indicated that claims 22 and 23 have been rejected under 35 U.S.C. § 103(a). However, Applicants submit that it appears that claims 22 and 23 are likely allowable based upon the grounds of rejection recited by the Examiner in the first through fifth paragraphs occurring under the heading "Claim Rejections-35 U.S.C. § 103" in the Office Action. Applicants request clarification of this matter if the Examiner maintains the rejections to these claims in a subsequent Office Action.

Drawings

The drawings have been objected to by the Examiner. However, no PTO-948 has been supplied with the Office Action. Applicants have prepared formal drawings that are being submitted concurrently and separately herewith that attempt to address the Examiner's requested changes.

With respect to the recitation of "walls" in claim 6 (amended to singular "wall" by the foregoing amendment), Applicants submit that one of ordinary skill in the art would appreciate that an inner wall is shown in the accompanying figures. The feature of the internal mold supporting the end of the tube and shaping the inner surface is shown by the accompanying figures, including but not limited to FIGs. 1A through 3 (showing a shaped and an unshaped inner wall with an internal mold within the tube).

Minor Informalities

The Examiner has identified potential informalities with the specification. In light of the foregoing amendments to the specification and claims, these objections have been rendered moot. Applicants submit that each of these objections has been obviated and/or rendered moot.

Claim Rejections Under 35 U.S.C. § 112

Claims 1-18 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the

subject matter of the claimed invention. This rejection is respectfully traversed.

Applicants respectfully submit that the requirements of 35 U.S.C. § 112, sixth paragraph do not require that the term "means" explicitly appear in the specification, e.g., one of ordinary skill in the art would readily appreciate the corresponding structure that accomplishes the functional aspects of the means plus function limitation(s) of the originally claimed invention.

However, in light of the foregoing amendments to the claims, Applicants respectfully submit that all of the rejections have been obviated and/or rendered moot. Without conceding the propriety of the Examiner's rejection, but merely to timely advance the prosecution of the present application, Applicants have amended the claims to remove the presence of the alleged informalities. Accordingly, this rejection should be withdrawn.

Claim Rejections Under 35 U.S.C. § 102

Claims 1-5, 7-9, 16, 17 and 19 stand rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by Doty (U.S. Patent No. 3,293,018). Claims 1 and 6 stand rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by Zauner (U.S. Patent No. 3,257,186). Claims 7-11 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Zauner (U.S. Patent No. 4,441,908). These rejections are respectfully traversed.

In light of the foregoing amendments to the claims, Applicants submit that these rejections have been obviated and/or rendered moot. Specifically, the prior art of record fails to teach or suggest each and every limitation of the unique combination of elements of the claimed invention.

With respect to the Doty reference and the claimed invention of at least claims 1 and 5, the prior art of record fails to teach or suggest the combination of elements, including the limitation(s) of: "an internal mold having an exterior surface for supporting and shaping the inner surface of the selected end region of the tube when the tube is rendered malleable; and an insertion device for inserting said internal mold within said selected end region of the tube, prior to the application of heat to the tube, wherein said insertion device includes at least one of a sleeve and a handle." In the flange forming device of Doty, it appears that the interior surface of the alleged interior mold shapes the flanged portion, not an exterior surface. Further, the insertion device does not include at least one of a sleeve and a handle. Applicants request clarification as to where in the prior art of record these features are taught or suggested if this rejection is maintained.

With respect to the Doty reference and the claimed invention of at least claims 7 and 19, the prior art of record fails to teach or suggest the combination of elements, including the limitation(s) of: an internal mold for shaping an inner surface of the selected end region of the tube, said internal mold being selectively operable and collapsible between an open and extended

configuration and a closed and collapsed configuration. As indicated by the Examiner's remarks (Office Action, page 3, line 7, "Doty does not have a collapsed configuration"), it does not appear that the prior art of record teaches or suggests an internal mold being selectively operable and collapsible between an open and extended configuration and a closed and collapsed configuration. Accordingly, this rejection should be withdrawn.

With respect to claims 1 and 6 and the Zauner '186 reference, Applicants respectfully submit that the prior art of record fails to teach or suggest the combination of elements of the claimed invention, such as the limitation of "an insertion device for inserting said internal mold within said selected end region of the tube, prior to the application of heat to the tube, wherein said insertion device includes at least one of a sleeve and a handle." The Examiner is requested to reconsider this rejection since elements 27 and 28 in the Zauner '186 reference correspond to a tool for merely supporting and maintaining an opening 26a. However, this tool does not appear to serve as an internal mold. Instead, a bore tapering tool 31 is used to shape the internal surface (see FIG. 2B of Zauner).

With respect to claims 7-11 and the Zauner '908 reference, Applicants respectfully submit that the prior art of record fails to teach or suggest the combination of elements of the claimed invention, such as the limitation(s) of "an internal mold for shaping an inner surface of the selected end region of the tube, said internal mold being selectively operable and collapsible between an

open and extended configuration and a closed and collapsed, configuration." It does not appear that the Zauner '908 reference teaches an internal mold having an open and extended configuration and a closed and collapsed configuration. Accordingly, these rejections should be withdrawn.

Claim Rejections Under 35 U.S.C. § 103

Claims 18, 20, 22 and 23 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Doty (U.S. Patent No. 3,293,018). This rejection is respectfully traversed.

In light of the foregoing amendments to the claims, Applicants submit that this rejection has been obviated and/or rendered moot. Applicants submit that it appears that claims 22 and 23 have been allowed by the Examiner. Accordingly, no further comment is provided with respect to these claims.

In accordance with the above discussion of the patents relied upon by the Examiner, Applicants respectfully submit that these documents, either in combination together or standing alone, fail to teach or suggest the invention as is set forth by the claims of the instant application.

Since the Doty reference fails to teach or suggest each and every limitation of even the independent claims, the rejection of claims 18 and 20 has been obviated and/or rendered moot.

Accordingly, reconsideration and withdrawal of the claim rejection are respectfully requested. Moreover, the Applicants respectfully submit that the instant application is in a condition for allowance.

As to the dependent claims, Applicants respectfully submit that these claims are allowable due to their dependence upon an allowable independent claim, as well as for additional limitations provided by these claims.

CONCLUSION

Since the remaining patents cited by the Examiner have not been utilized to reject the claims, but rather to merely show the state-of-the-art, no further comments are necessary with respect thereto.

All the stated grounds of rejection have been properly traversed and/or rendered moot. Applicants therefore respectfully request that the Examiner reconsider all presently pending rejections and that they be withdrawn.

Attached hereto is a marked-up version of the changes made to the application by this Amendment.

It is believed that a full and complete response has been made to the Office Action, and that as such, the Examiner is respectfully requested to send the application to Issue.

Applicants respectfully petition under the provisions of 37 C.F.R. § 1.136(a) and § 1.17 for a one-month extension of time in which to respond to the

Examiner's Office Action. The Extension of Time Fee in the amount of **$110.00** is attached hereto.

In the event there are any matters remaining in this application, the Examiner is invited to contact Matthew Shanley, Registration No. 47,074 at (703) 205-8000 in the Washington, D.C. area.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 15-1602 for any additional fees required under 37 C.F.R. §§1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

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Attachment: Version with Markings to Show Changes Made

MARKED-UP VERSION OF AMENDMENTS

IN THE SPECIFICATION:

The paragraph beginning on page 6 and ending on page 7 of the specification has been amended as follows:

Referring to Figs. 1A and 1 B there is shown an isometric and a cross sectional diagram, respectively, of a "preform" tube 8, where the term "preform", as used herein and in the appended claims, refers to the combined, unitary, structure of a starter tube 10 and an exhaust tube 12. The starter tube 10 is a long cylindrical glass tube in which fiber optic layers are deposited to form the fiber optic strands. The exhaust tube, 12, is also a long cylindrical glass tube having, generally, and for most of its length, a larger diameter than tube 10. Tube 12 is preferably made with a larger diameter than tube 10 so that the gases escaping EX from tube 10 into tube 12 which get deposited along the inner walls of tube 12, particularly near the interface with tube 10, do not result in a build up which would block the passage of the gases. Also, a smooth transition to an increasing diameter allows for well controlled, more uniform flow of the gases and reactants. Therefore, tube 12 is connected to the starter tube 10 to allow gases IN to escape from the starter tube in a controlled manner. When the preform 8 is used in the manufacture of optic fibers, reactants and gas vapors are introduced into the end 11 of starter tube 10. The unused gases and vapors escape from the starter tube 10 at the end 13. It is important that the "excess" gases flowing out of the starter tube 10 into the

exhaust tube 12 do so with as little turbulence as possible. Reducing turbulence helps ensure that the optic fiber layers are deposited more uniformly within the starter tube. To reduce turbulence, the exhaust tube 12 is preferably designed to have a larger diameter than the starter tube and to present no sharp curves or steps at the starter/exhaust tube interface. Furthermore, it is desirable that the exhaust tube be connected to the starter tube such that its center line (cl12) lies along an extension of the center line (cl10) of the starter tube. This ensures that, when the preform is subsequently mounted in an apparatus to form optic fibers, the preform will rotate uniformly and evenly. The exhaust tube 12 is also designed to have a larger diameter than starter tube 10 to ensure that gases escaping from the starter tube and deposited along the inner surfaces of the exhaust tube do not unduly narrow the path for the escaping gases.

IN THE CLAIMS:

Claims 9-11 have been cancelled.

The claims have been amended as follows:

1. (Amended) An apparatus for shaping a selected end region of a hollow cylindrical glass tube used in the manufacture of optic fibers comprising:

a support [means] device for holding the tube at a second region[,] other than the selected end region[,] and for rotating the tube in a controlled manner;

a heat source adapted to supply sufficient heat to the selected end region of the tube to render [it] said tube malleable;

an internal mold having an exterior surface for supporting and shaping the inner surface of the selected end region of the tube[,] when the tube is rendered malleable;

an insertion device [means] for inserting said internal mold within said selected end region of the tube, prior to the application of heat to the tube, wherein said insertion device includes at least one of a sleeve and a handle; and

[means] an exterior molding device for compressing the exterior surface of the selected end region of the tube and for shaping the exterior surface of the selected end region of the tube[,] when rendered malleable, and for, concurrently[,] causing the shape of the inner surface of the selected end region of the tube to conform to the exterior surface of the internal mold, wherein said exterior molding device includes at least one of an exterior mold and a paddle.

2. (Amended) [An] The apparatus as claimed in claim 1, wherein said internal mold [may be] is [selectively altered so it can assume] collapsible between an open[,] and extended[,] configuration [or] and a closed[,] and collapsed[,] configuration.

3. (Amended) [An] The apparatus as claimed in claim 2, wherein said apparatus [means for inserting said internal mold within said selected end region of the tube includes:] further comprises:

an activation device [(a) means] for setting the internal mold to its extended configuration, and [(b) means] for setting the internal mold to its collapsed configuration for withdrawing the mold from the tube through an opening in the selected end region, wherein said activation device includes at least one of an air cylinder, a spring-loaded mechanism, and a motor.

4. (Amended) [An] The apparatus as claimed in claim 3, wherein setting the internal mold to its collapsed configuration causes the internal mold to occupy a [small] volume smaller than an extended volume when in the extended configuration in order to enable the mold to be easily retracted from the selected tube end.

5. (Amended) An apparatus [as claimed in claim 1,] for shaping a selected end region of a hollow cylindrical glass tube used in the manufacture of optic fibers comprising:

a support device for holding the tube at a second region other than the selected end region and for rotating the tube in a controlled manner;

a heat source adapted to supply sufficient heat to the selected end region of the tube to render said tube malleable;

an internal mold having an exterior surface for supporting and shaping the inner surface of the selected end region of the tube when the tube is rendered malleable;

an insertion device for inserting said internal mold within said selected end region of the tube, prior to the application of heat to the tube, wherein said insertion device includes at least one of a sleeve and a handle; and

an multi-part, exterior mold for compressing the exterior surface of the selected end region of the tube and for shaping the exterior surface of the selected end region of the tube when rendered malleable, and for, concurrently causing the shape of the inner surface of the selected end region of the tube to conform to the exterior surface of the internal mold

[wherein means for compressing the exterior surface of the selected end region of the tube and for shaping the exterior surface of the selected end region of the tube includes manual means for shaping the exterior end region of the tube].

6. (Amended) [An] The apparatus as claimed in claim 1, further comprising a mechanically actuated holding device [wherein the means for compressing the exterior surface of the selected end region of the tube and for shaping the exterior surface of the selected end region of the tube includes an actuatable mechanical holding means] for holding [an] the exterior mold and for selectively applying the exterior mold to [the] an outer periphery of the

selected end region of the tube[,] when the tube is rendered malleable, [for shaping the exterior of the selected end region of the tube while the] said internal mold cooperatively supporting an [supports the] inner [walls] wall of the tube and [controls] controlling the shape of [the] an inner diameter of the tube.

7. (Amended) An apparatus [Apparatus] for shaping a selected end region of a hollow cylindrical glass tube used in the manufacture of optic fibers comprising:

a support device [means] for holding the tube at a second region[,] other than the selected end region[,] and for rotating the tube in a controlled manner;

[a]an internal mold for shaping [the] an inner surface of the selected end region of the tube, said internal mold being selectively operable and collapsible between [settable to] an open[,] and extended configuration [or] and a closed[,] and collapsed[,] configuration;

[means] an insertion device for inserting said [variable configuration] internal mold within said selected end region of the tube and for setting the internal mold in its extended configuration[; said mold, when inserted in the selected end of the tube and when in its extended configuration, for shaping the inner surface of the selected end region of the tube];

a heat source [adapted to supply sufficient] supplying heat to the selected end region of the tube to render [it] the tube malleable; and

[means] at least one of an external mold and a paddle for compressing the exterior surface of the selected end region of the tube[,] when rendered malleable, and for[,] concurrently[,] causing the shape of [the] an inner surface of the tube to conform to the exterior surface of the internal mold [molding means].

8. (Amended) [An] The apparatus as claimed in claim 7, further comprising an activation device for setting the internal mold to its extended configuration and for setting the internal mold to its collapsed configuration for withdrawing the mold from the tube through an opening in the selected end region, wherein said activation device includes at least one of an air cylinder, a spring-loaded mechanism, and a motor [wherein said means for inserting said mold within said selected end region of the tube also includes means for setting the mold to its collapsed configuration for withdrawing the mold from the tube through an opening in the selected end region].

12. (Amended) An apparatus [as claimed in claim 11 further including] for shaping a selected end region of a hollow cylindrical glass tube used in the manufacture of optic fibers comprising:

a support device for holding the tube at a second region other than the selected end region for rotating the tube in a controlled manner;

an internal mold for shaping an inner surface of the selected end region of the tube, said internal mold being selectively operable and collapsible between an open and extended configuration and a closed and collapsed configuration;

an insertion device for inserting said internal mold within said selected end region of the tube and for setting the internal mold in its extended configuration;

a heat source supplying heat to the selected end region of the tube to render the tube malleable;

an external mold for compressing the exterior surface of the selected end region of the tube when rendered malleable, and for concurrently causing the shape of an inner surface of the tube to conform to the exterior surface of the internal mold; wherein said external mold includes a pair of side pieces for imparting an oblate, cone-like shape to inner and outer diameters of the tube along the selected end region while leaving an opening between the side pieces for enabling a withdrawal of the external mold when set to the collapsed configuration;

a mechanically actuated holding device for supporting the external mold; and

a temperature sensing [means] device for sensing the temperature of the selected end region of the tube.

13. (Amended) [An] The apparatus as claimed in claim 12, wherein the temperature sensing [means] device is a pyrometer producing an actuating signal coupled to the [actuatable mechanical holding means] mechanically actuated holding device when the temperature of the selected end portion is such that the end portion is in a malleable state.

14. (Amended) [An] The apparatus as claimed in claim 13, wherein the heat source is a torch and wherein said actuating signal produces a signal for removing the torch when the exterior [shaping] mold is applied to the selected end portion of the tube.

15. (Amended) [An] The apparatus as claimed in Claim 14, wherein said temperature sensing [means for sensing the temperature] device controls the intensity of the heat source [applying heat] being applied to the selected end portion of the tube.

16. (Amended) [An] The apparatus as claimed in Claim 8, wherein the tube is a first tube and wherein the variable configuration mold and the exterior [shaping] mold shape the opening of the first tube to enable a second tube to be inserted [snuggly] within the first tube[, while] and permit the alignment of the first and second tubes [can be easily aligned to have] along a common center line.

17. (Amended) [An] The apparatus as claimed in Claim 7, wherein the support [means] device is a lathe.

18. (Amended) [An] The apparatus as claimed in Claim 7, further including an optical sensing [means] device for sensing [the] a physical condition of the tube.

19. (Amended) A method for shaping a selected end of a hollow cylindrical tube comprising the steps of:

positioning the tube within a support [means] device and rotating the tube;

inserting an internal mold within the selected end region of the tube to support the tube end when the tube is being shaped and for controlling the shape of [the] an inner surface of the tube end, wherein the internal mold is operatively collapsible between an extended and open configuration and a collapsed and closed configuration;

heating the selected end of the tube with a heat source until the selected end becomes malleable; and

compressing the exterior surface of the selected end region of the tube for concurrently shaping the exterior and inner surfaces of the selected end region of the tube into a predetermined form, wherein the exterior surface of

the selected end region is compressed with at least one of an exterior mold and a paddle.

20. (Amended) [A] The method as claimed in claim 19, [wherein the internal mold is settable to an extended open, configuration and a collapsed, closed, configuration, and] wherein the step of inserting the internal mold includes [the] a step of setting the internal mold to its open configuration before and during [the time] a period in which heat is applied to the selected end of the tube.

21. (Amended) [A] The method as claimed in claim 20, wherein the step of compressing the exterior surface of the selected end region of the tube for concurrently shaping the exterior and inner surfaces of the selected end region of the tube includes [the] a step of applying [an] the external mold to the selected end of the tube when the selected end [segment] becomes malleable.

22. (Amended) A method for shaping [the] an opening and an end region at a selected end of a cylindrical tube comprising the steps of:

holding a portion of the tube[,] other than the selected end, [firmly] and rotating the tube;

inserting an internal mold into the selected end of the tube for supporting the end of the tube and for shaping the inner surface of the tube, [when heat is supplied to the selected end of the tube];

applying a heat source to the selected end [region] of the tube until the selected end [region] becomes malleable;

sensing the temperature of the selected end [region] of the tube; and

[in response to sensing a certain temperature] applying an exterior mold to the outer periphery of the tube along the selected end [region] in response to sensing a certain temperature for tapering the selected end [region] of the tube and gradually reducing the inner diameter of the tube from a second value to a first value.

23. (Amended) [A] The method as claimed in claim 22, wherein said internal mold is a mold [whose shape may be selectively altered] having a selectively alterable shape.